

1. Although light is the input to 80% of our brain
sound is what makes the difference. The wood
hard disc and input and output are all sound

SOUND - LANGUAGE - INFORMATION
Even the Sumerians talked about $\frac{1}{15} \times \frac{1}{2} \times \frac{1}{2}$
Hieroglyphics Printure. - The phonetic
thing became medium of information. brother
and abstraction.

2. Now Look AT SOUND
The Questions are
.....
Physics Ideas -

3. Who all make sound

Flin	Bird	man
Leaf hopper	Wales	Elephant & infra
beetles (that is)	Dolphin	Rhino
		Man

Shaw Dupuis the

THINKING PHYSICS / INFORMATION & D BRIDG
(MILL DO) & DM have
Bridg & Gaudin

Simplest Case

- Propagation of Sound in one dimension

An object - is moved at one place in Air

disturbance in Air - motion of object change

of pressure - if motion rapid enough -

change of pressure pushes additional Air - in

Air in turn is compressed which in turn

leads to extra pressure and a wave propagates

Variables Displacement, pressure, velocity, acceleration

- In one dimension is source for wavefront

Planar

The displacement χ depends on x and t , and not y & z

describing it as $\chi(x, t)$ - clear

that we describe gas with length

frequency 47.3 ... 4.5

$$\frac{\partial^2 \chi}{\partial t^2} = v^2 f''(x - vt) \quad c_s = \sqrt{\left(\frac{dP}{d\rho}\right)_0}$$

$$P = \text{const } \bar{P}_0 \quad c_s^2 = \frac{\partial P}{\partial \rho} = \frac{\partial (kT/n)}{\partial (m n)} = \frac{kT}{m}$$

(n = molecular unit; m = mass of molecule)

up to 4.7

Sound Contrasts with light:

1. No Sound reaches from the Stars
- although what Maxwell said about all forms of energy is true - the immediate generation is right here in Sound.
2. No chemistry - no botany -
no microbiology
3. To imagine being deaf. Not being able to enjoy music or speech. Only with a lot of training would one be able to speak, or coherently or even speak at all - no shops roads etc. Some half of life will not exist, the other perilous - these thoughts make you aware of the functions of hearing and realizing how the ordinary world is full of sounds of enormous variety like hum (fan) the buzz (fly) the whistle (kettle)

All have names because they are
(humpback) some subtle sound differences
distinguishable. (your kettle &
my kettle) who is talking to who
in his next room.

That brings us to two

things

Of all the people you know
how many you would not easily

identify by their voice?
In his context & voice - speech.

It is remarkable that

such a huge variety of differences

exist - and even more that
receiving signals from his ear
his brain can distinguish

amongst means

Compared to light
(smaller) serves long

I may say

distance (particularly when his
communication is a barrier between)

light of only some insects and
insects. pictures are reflection -

- Sound ^{has} such variety - ^{anywhere, however} where
Sound is used like light say for
source of objects - in world view
may be even more prettier.

Meaning: Do they tell us something?
What do they mean to us?

a buzzing fly / mosquito
at night may irritate you to
the point where you drop
everything and set to swat the
pest
- fan, lawn mower, boss's chatter
around the corner. It informs
you of the world around especially
the part which your other senses
cannot reach. Sound can

Arouse emotions etc (and
much is learnt through association)

As I speak of sound
informing you, notice that
in Schopenhauer's 'Lectures', that whether
responding now or learning
about & earlier - then we are
also, sounds - what's other
sounds around - you "simply"
do not listen to them
Simply!!

Of it really so
simple to hear the sound
that for some reason
interests you and a host
of others of him louder?

The 'Party Situation'

Room full of people
talking, singing shouting
all together in groups. Yet
you can hear easily to
a joke being told by someone
on your right and next
moment also ~~notice~~ 'switch' to
mistle of a silk screen on
his left without even moving
his head. Your ears were
getting his same sound but
you directed your attention. If
a Tape recording were made

at exactly the same point
in space & time & you
heard it, you would never
make out a thing. You
will not be able to
'direct' your attention to
anywhere but you (to loudspeakers)
which now produces a garbled
noise. Obviously "listening"

is not as simple.

We have obviously
called here about human -
Bears, cats, dogs also hear
- how much of this and
how well amongst them would
be a musician.

What sounds they hear
and how do they react to
them (what is the "meaning")

[Dasanna - Do meramian
story]

Cows
milkman

Grows M
ladle tap

Sound associated in him cases in hearing

~~Must SPECIALIST in his sound worm~~
~~MARPIE ROBIN - EARLY MORDEN WORM~~
~~the reflected sound~~

Bat the
tells about food. (hunting
by ear") - Bat's ear
trained to distinguish object
by reflectin' smell. So we know
they can make out. But
do their food "Sound"
appetizing! (the has "smell"
or 'looks').

Communication.

1st level For most animals
Sound is the major form of
communication (because they can
"talk" & "hear" (transmit
& receive) - & it is long distance.

2nd level ^{Ex} when forest denser
Population of Maypre - their
males & females
probably meet each other
wandering to view distance. They
would never have to utter a
sound. but on the other hand
the ♂ "stake out" females
by proclaiming loudly.

To his 6th ♂ - his

Song informs him of his

^{Rival} ~~himself~~, his strength and
(as he weakens) & what

chances he has of being able to
challenge him. Most males would
keep off him. By his

look must of what

same keep off of his meaning he

same. For ^{AD} ~~he~~ ^{ad} ~~is~~ ^{Reads like} an

"A bachelor of means good
from a

citizen with large home who

offers protection - apply in

Person. "

Can for sure
such as 6th song & then
15 communication
- 2 emotion

Communicate : Just a man's

was sound & clearly to
convey Anger, fear, Joy
Suffer - he has to express
(although his are other
too - born feelings) . In
his form of language
has reached its pinnacle
as his form of language
and his when he can be

Little Communicator

Things I

Radio waves :

Who with power receive all
his place travel and away, but a
is not much different to

WONDER how it sneaks
how he for what
& picks

know but a low sound can be
less than 1000 heard a 1000 miles
away. (leave alone that
volume ^{low} sure any in sand a
moderate).

Range of Sound Power

MARCUS VITRUVIUS POLLIO

- Roman architect pictured
sound \rightarrow material flow going
out in expanding spheres

for a sound. Sound of 1 foot.
dia sphere in a mist well
have spread much more
I think \approx 12 foot sphere.

When we are
500 feet away for a

buzzing fly with $\frac{1}{300,000}$ fly power

\Rightarrow Compare ~~power~~ we fly
100 horse power car seems order
100 watt bulb looks much less
powerful but a 100 watt
amplifier would rock in hours.
In fact a low amp power
more sound than we can tolerate in
an average - 90% is difficult
to imagine how much we would
hear of a 100 watt amplifier
2000 miles away. but it is
a figure expressive of
the sensitivity of human
hearing. is this range.

Weber: When you look at
objects (at distance) that make a difference is
a CONSTANT RATIO

One side has 12 S.T. longer than the other
Weber law states that fractional
difference is more important in
distinguishing magnitudes of stimulus like
Sound.

Fechner said that
went up a constant amount when
pure went up by a constant factor
Ratio of decibel (80 phn)

General Sound we immediately
associate with vibration:

Nature of Sound wave
Compression is an elastic

medium or
=) leave 6
unmarked

1. TELL ME WHAT IS
SOUND WITHOUT SAYING
WHAT WE HEAR BY EARS

(NO PROBLEM SAYING
VISION, LIGHT. ...)

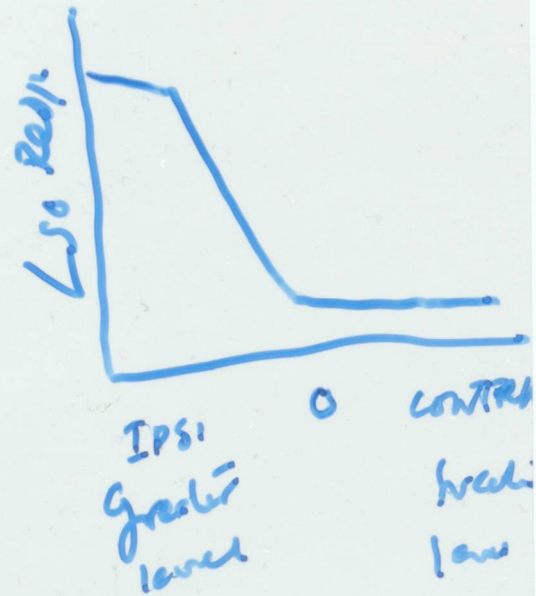
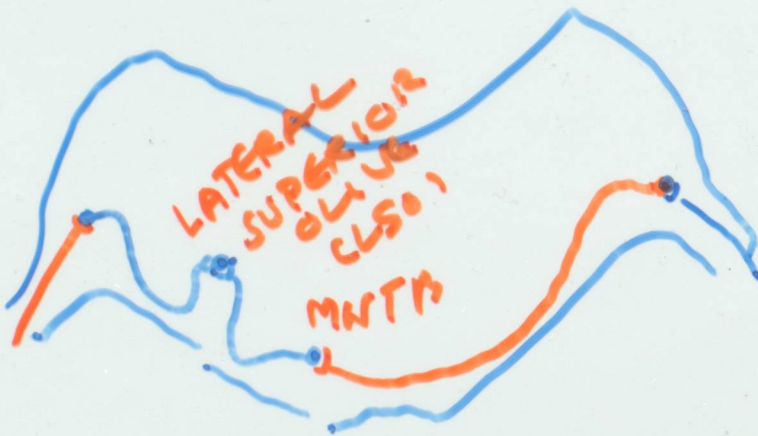
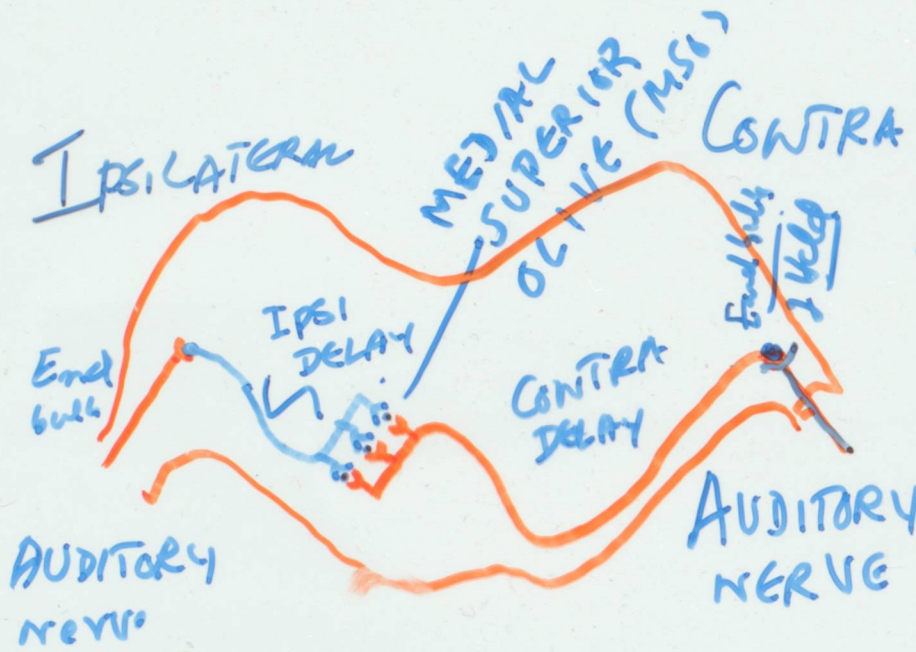
WHAT

WHO

WHERE

HOW

Oscillations - WAVES



MEDIAL NUCLEUS OF TRAPEZOID BODY

MSO Response any when inputs

1. { SOUND ... Physics
STRUCTURE OF SOUND
2. { ORGANS ... & ORGAN PIPES
... MAKING OF SOUND

3. SENSE & SENSIBILITY
PERCEIVING.

VIDEO 1

4. MEANING & CONTENT
ANALYSIS ..

VIDEO 2

5. SOUND OF MUSIC
LEWANT & ... ASPECTS OF HUMAN
HEARING

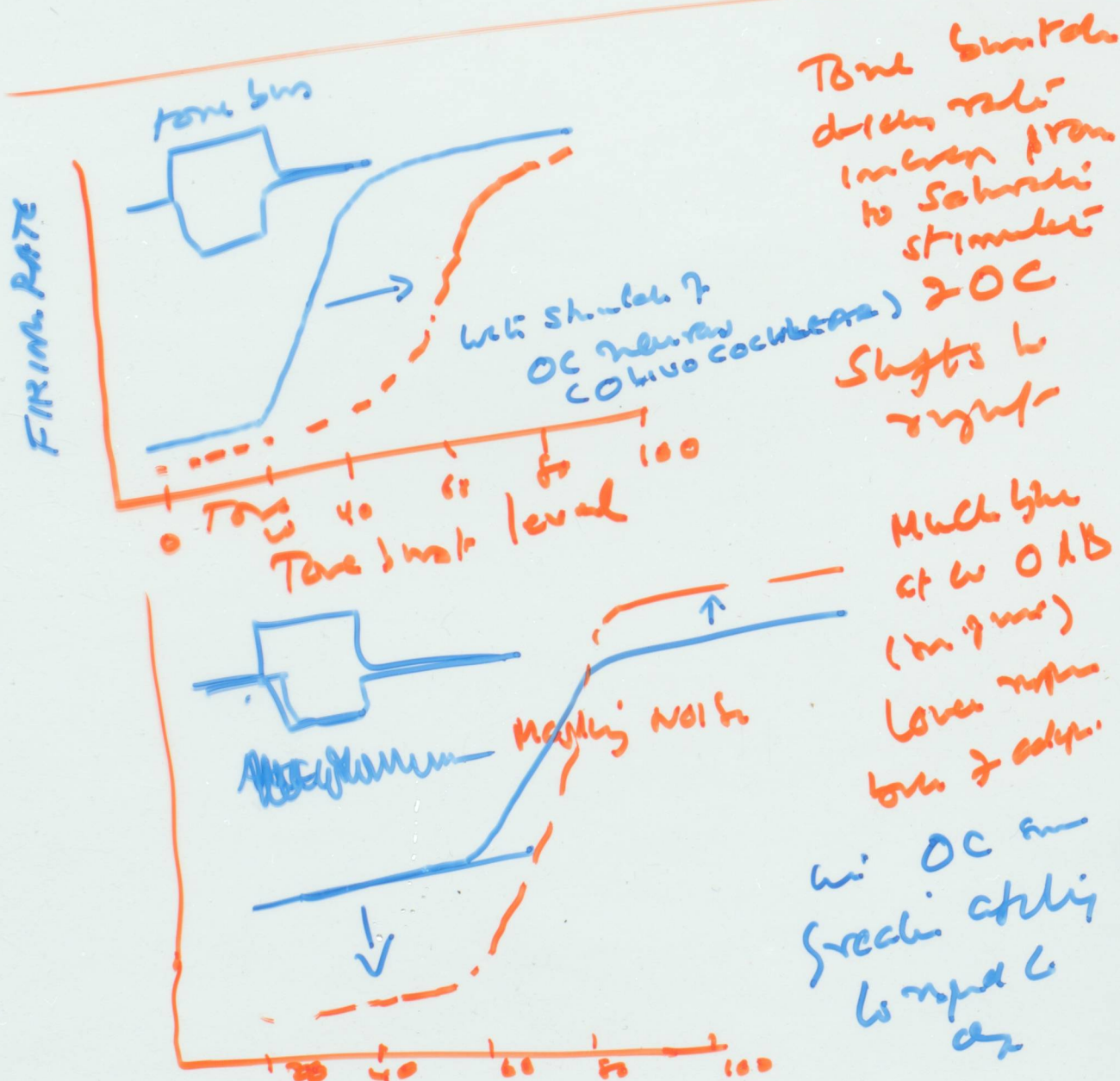
6. ✓ SINGING IN THE RAIN - 1
BIRD SONGS

7. { SINGING AND DANCING
IN THE RAIN
LEWANT OF CRICKETS & OTHERS

8. ^{ML} MOLECULAR SOUND
MORE VIDEO - 2 + DISCUSSION

MASKING: involves adaptation
and suppression. & also
"line busy" or refractory properties

Adaptation happens at hair-cell
- nerve synapse since there's
little adaptation & receptor potential



Tone burst
dramatic
increase from
to saturated
stimulus
20C
Shifts to
right

Much higher
at low dB
(in quiet)
Lower response
level & adapts

OC are
firing ability
to respond
at

Neuron (1991)

19 (5) 947-50

Ann Rev Cell Biol (1988)

4 63-92

~~576~~ 3(047-1)

~~100078~~

Cur opinion in Neurology 8(4) 1998

Science (1985)

230

745-52